

EFFECTS OF A FRUIT AND NUT DIET

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EFFECTS OF A FRUIT AND NUT DIET

Fruits and nuts have been considered as accessory or supplementary foods, and to be eaten out of hand at odd times, but this idea is rapidly passing away. Because they were not eaten for the nutritive value which they contained, very little scientific study has been given the fruits and nuts compared with the investigations which have been carried on in connection with the more commonly used foods.

The term "nut" is not a definite one botanically speaking, but is applied indiscriminately to a variety of certain fruits, or parts of fruits, and implies a more or less hard, woody covering surrounding a meat or kernel. The peanut which is usually classed with the nuts, strictly speaking is not a nut, but the fruit of a leguminous plant and is closely related with the pea and bean.

The flavor of nuts depends upon the oils which they contain. In case the oil becomes rancid a very disagreeable flavor is produced. If rancid nuts are eaten in large quantities they will cause sickness, due to the irritating quality of the fatty acids.

The chestnut has a starchy taste as well as the nutty flavor; most almonds are mild in flavor; they contain hydrocyanic acid which with the glucose forms amygdalin.

Some nuts, as the peanuts, are roasted before eating.

In the case of the peanut the flavor depends upon the browned oil and carbohydrates. As a rule, nuts native to America are more highly flavored than the Italian or Japanese nuts.

The edible portion of nuts is very concentrated. That is, contains little water and a large amount of fat. In general, concentrated foods are a cheaper source of nutrients. In the case of nuts they are considered as a cheap food, not only because they are concentrated, but because they require little preparation, no fuel, and there is only a small amount of waste.

The average nuts contain fifty times as much fat and less than one fifth as much carbohydrate, as wheat flour; one pound of unshelled nuts will furnish about one half as much proteid and the same amount of energy as a pound of flour.

Nuts are generally considered as being hard to digest, and it is true that in some cases there is great discomfort after eating them. But this is usually due to the fact that they are not well masticated, or eaten when they are not needed.

Nuts are made more palatable to most people by the addition of salt. This does not in any hinder their digestion.

Fruits have held in past years about the same place in the diet that nuts have, merely as an accessory food. At the present time fruit furnishes 5.6 per cent of total food, 4.9 per cent of the total carbohydrate of the average American diet.

The uses of fruit in the diet have been summed up in the following:-

Tempt the appetite

Gratify the appetite
Furnish variety to the diet
Relieve thirst
Furnish nutriment
Supply organic salts
Stimulate kidneys
Act as a laxative

Fruit contains about eighty per cent of water. The solid matter consists of cellulose, sugars, gums, organic acids, and mineral matter. In addition to this, fruit contains aromatic substances belonging to the class of essential oils and compound ethers, which give them the agreeable odor which adds much to their flavor; colors of fruits are due to the different condition of chlorophyll.

Albuminous matters are present in so small quantities that their tissue forming value is of no importance. Thus, to obtain an amount of albumin matter equivalent to the contents of one egg, there must be eaten more than a pound of cherries, nearly one and one half pounds of grapes, two pounds of strawberries, more than two pounds of apples or four pounds of pears. One pound of starch, which is equivalent to about 5.5 pounds of potatoes, may be replaced by the carbohydrate of 5.4 pounds of grapes, 6.7 pounds of cherries or apples, 10.8 pounds of currants, or 12.3 pounds of strawberries.

The different berries contain, as a general rule, a larger proportion of free acid than stone fruits, apples or pears.

The malic acid of the apples, the tartaric acid of

grapes and berries, the citric acid of lemons, etc., consist largely of oxygen, the element of combustion, therefore it is thought that fruits directly aid in maintaining the essential equilibrium of heat in the system.

In eating fruits a large amount of water is taken into the system and in this way cleanses it. The body readily absorbs the organic salts of potassium, sodium and calcium which are held in solution by the fruit juice.

As a whole, fruits are valuable and should not be omitted from the diet.

A well balanced ration can be worked out, using fruits and nuts only. The fruits furnish the bulk, organic salts, some carbohydrate and liquid, while the nuts are the concentrated food furnishing fat and proteid.

As an experiment of the fruit and nut diet, two college students attending the Kansas Agricultural College took up the diet. They were strong, healthy young women, taking the regular senior studies and playing basket ball. They lived exclusively on fruits and nuts. Neither the fruits or nuts were prepared in any way.

Table I. Chemical Composition of Fruits and

	Refuse	Nuts Used		Fat	Carbo- hydrate	Ash	Fuel value
		Water	Protein				
Oranges	27.0	63.4	.6	.1	8.5	.4	170.
English walnuts	58.1	1.0	6.9	26.6	6.8	.6	1375.
Raisins	10.1	13.1	2.3	3.0	68.5	3.1	1445.
Apples	--	28.1	1.6	2.2	66.1	2.0	1350.

Almonds	45.0	2.7	11.5	30.2	9.5	1.1	1660
Peanuts	24.5	6.9	19.5	29.1	18.5	1.5	1935
Dates	10.0	13.8	1.9	2.5	70.6	1.2	1450
Figs	--	18.8	4.3	.3	74.2	2.4	1475
Bananas	35.0	48.9	.8	.4	14.3	.6	300
Cocoanuts	48.8	7.2	2.9	25.9	14.3	.9	1413

Table II

Date	Materials	Amounts in pounds	Total calories	Nutritive ratio	Comments
Sunday	Eng. Walnuts	2 pounds	2700	1:10	Impossible for subjects to eat that quantity. Therefore excess was weighed back.
Mar. 1, '08	Bananas	3.1 "			
	Peanuts	.14 "			
Monday					
Mar. 2	Oranges	1.8 "	2700	1:10	Excess was weighed back.
	Eng. Walnuts	.5 "			
	Raisins	.8 "			
Tuesday	Apples	.2 "	1350	1:10	No sensation of hunger
	Almonds	.6 "			
Mar. 3	Oranges	1.1 "			
Wednesday	Peanuts	.41 "	2000	1:10	Eaten without difficulty
Mar. 4	Apples	.29 "			
	Dates	.74 "			
Thursday	Peanuts	.82 "	2000	1:10	Hunger
Mar. 5	Figs	.18 "			
	Oranges	.74 "			

Friday	Oranges	1.3 "	2000	1:10	Not satisfied Wanted some- thing else to eat.
Mar. 6	Peanuts	.36 "			
	Raisins	.64 "			
Saturday	Peanuts	.82 "	2000	1:10	
Mar. 7	Figs	.18 "			
	Oranges	.74 "			
Sunday	Oranges	2.9 "	2000	1:10	Found it difficult to eat 3.1 lb. banana.
Mar. 8	Bananas	3.1 "			
	Peanuts	.27 "			
Monday	Bananas	.9 "	2000	1:10	Appetite gone
Mar. 9	Almonds	.63 "			
	Figs	.45 "			
Tuesday	Oranges	1.6 "	2000	1:10	
Mar. 10	Almonds	.61 "			
	Dates	.41 "			
Wednesday	Figs	.24 "	2000	1:10	English wal- nuts found to be very hard to digest.
Mar. 11	Eng. Walnuts	.77 "			
	Apples	2.4 "			
Thursday	Peanuts	.58 "	2000	1:10	
Mar. 12	Dates	.55 "			
	Apples	.38 "			

Friday	Dates	.55 "	2000	1:10	Subject II sick.
Mar. 13	Peanuts	.58 "			
	Apples	.38 "			
Saturday	Peanuts	.82 "	2000	1:10	Subject III took place of II in dietary.
Mar. 14	Figs	.18 "			
	Oranges	.74 "			
Sunday	Oranges	2.9 "	2000	1:10	
Mar. 15	Bananas	3.1 "			
	Peanuts	.27 "			
Monday	Peanuts	.58 "	2000	1:10	
Mar. 16	Dates	.55 "			
	Apples	.38 "			
Tuesday	Peanuts	.62 "	2000	1:10	
Mar. 17	Cocoanuts	.4 "			
	Apples	.7 "			
Wednesday	Dates	.41 "	2000	1:10	
Mar. 18	Almonds	.61			
	Oranges	1.6 "			
Thursday	Apples	.30 "	2000	1:10	
Mar. 19	Almonds	.94 "			
	Figs	.24 "			

Friday	Oranges	3.8	"	2000	1:10	Subject I sick.
Mar. 20	Bananas	1.3	"			
	Almonds	.5	"			
Saturday	Peanut	.58	"	2000	1:10	Subject IV took place of I in dietary
Mar. 21	Dates	.55	"			
	Apples	.38	"			
Sunday	Oranges	3.8	"	2000	1:10	
Mar. 22	Bananas	1.3	"			
	Almonds	.5	"			
Monday	Peanuts	.82	"	2000	1:10	
Mar. 23	Figs	.18	"			
	Oranges	.74	"			
Tuesday	Apples	.30	"	2000	1:10	
Mar. 24	Almonds	.94	"			
	Figs	.24	"			
Wednesday	Peanuts	.51	"	2000	1:10	
Mar. 25	Oranges	.64	"			
	Figs	.08	"			
	Raisins	.32	"			
Thursday	Figs	.23	"	2000	1:10	
Mar. 26	Eng. Walnuts	.37	"			
	Apples	1.33	"			
	Almonds	.46	"			

Friday	Bananas	.45	"	2000	1:10
Mar. 27	Almonds	.31	"		
	Figs	.11	"		
	English walnuts	.44	"		
	Apples	.13	"		

Table III

Materials	Amounts	Cost per pound	Total cost
Oranges	25 lbs.	.08 ¢	\$2.00
English walnuts	4.08 "	.20	.82
Raisins	1.76 "	.10	.176
Apples	6.79 "	.08	.543
Almonds	6.71 "	.25	1.67
Peanuts	6.24 "	.10	.624
Dates	3.98 "	.10	.398
Figs	2.31 "	.25	.577
Bananas	14.51 "	.06	.870
Cocoanuts	.4 "		.05
Total cost of dietary			\$15.256
Cost per person per day			.282

Table IV
Measurements and Tests Taken Before and After Diet

Subject I On diet for twenty-one days

	Before	After
Age	21 years	21 years
Weight	156 lbs.	149 lbs.
Girth of neck	13 inches	13 inches
" " chest, normal	37-1/4 "	36-1/2 "
" " " full	39-3/4 "	39-1/4 "
" " waist	26-1/2 "	25-3/4 "
" " hips	41-3/4 "	41-1/4 "
" " calf, right	14-1/2 "	14-1/4 "
" " calf, left	14-3/4 "	14-1/2 "
" " upper arm, right	11-1/2 "	11-1/4 "
" " " " left	11 "	10-3/4 "
" fore arm, right	10-1/2 "	10-1/2 "
" " " left	10 "	10 "
Breadth of neck	3.9 "	3.9 "
" shoulders	16.4 "	16.3 "
" waist	8.4 "	7.5 "
" hips	14. "	13.5 "
Depth chest	7.2 "	7.2 "
" abdomen	6.5 "	6.5 "
Capacity of lungs	176	186

Muscles	180 lbs.	168-1/4 lbs.
Pulse sitting	72	60
" standing	78	60
Respiration, sitting	24	24
" standing	24	28
Pulse on exertion	94	80

Urinalysis

Specific gravity	.028	.026
Albumin	none	none
Sugar	"	"

Subject II On diet for fourteen days

	Before	After
Age	20 years	20 years
Weight	143 lbs.	138-1/4 lbs.
Girth neck	12-3/4 inches	12 inches
" chest, normal	33 "	31-3/4 "
" " full	35-3/4 "	34-1/2 "
" waist	25-1/4 "	24 "
" hips	41-1/4 "	40 "
" calf, right	15-1/4 "	15 "
" " left	15 "	15 "
" upper arm, right	12-1/4 "	12 "
" " left	12-1/4 "	12 "
" fore arm, right	10-1/2 "	10-1/4 "
" " left	10 "	10 "

Breadth neck	3.9 inches	3.8 inches
" shoulders	14.4 "	14.2 "
" waist	8 "	7.5 "
Depth chest	7.1 "	7 "
" abdomen	6.2 "	5.1 "
Capacity of lungs	194	173
Muscles	115 lbs.	107-3/4 lbs.
Pulse, sitting	80	96
" standing	88	100
" on exertion	100	128
Respiration, sitting	24	24
" standing	28	28

Urinalysis

Albumin	none	none
Sugar	"	"

After diet there was a large deposit of urates and phosphates.

Subject III

On diet fourteen days

	Before	After
Age	22 years	22 years
Weight	177-1/2 lbs	169.5 lbs.
Girth head	22-1/2 in.	22-1/2 in.
" neck	13 "	13 "
" chest, normal	41-3/4 "	40-1/2 "
" " full	43-1/4 "	42-1/2 "

Girth waist	30 inches	29-1/2 in.
" hips	45-1/4 "	44-3/4 "
" calf, right	15-1/2 "	15 "
" " left	15-1/2 "	15 "
" upper arm, right	14-1/2 "	14 "
" " " left	14-1/4 "	13-1/2 "
" fore arm, right	10-1/4	10-1/2 "
" " " left	10 "	10 "
Breadth of head	6 "	6 "
" neck	4.4 "	3.9 "
" shoulders	15.5 "	15.3 "
" waist	8.5 "	8.3 "
" hips	15.5 "	14.8 "
Depth chest	9.1 "	8.5 "
" abdomen	8.3 "	7.6 "
Capacity lungs	165	187
Muscles	90-1/2 lbs.	100.5 lbs.
Pulse, sitting	88	88
" standing	100	84
" on exertion	120	124
Respiration sitting	20	20
" standing	24	20

Urinalysis

Specific gravity	.024	.024
Sugar	none	none
Albumin	"	slight trace.

Subject IV

On diet seven days

	Before	After
Age	23	23
Weight	114-3/4 lbs.	114 lbs.
Girth neck	12-3/4 in.	12-3/4 in.
" chest, normal	34-1/2 "	34 "
" " full	37 "	36-1/4 "
" waist	24-1/2 "	24 "
" hips	37 "	36-1/2 "
" calf, right	13-1/4 "	13-1/4 "
" " left	12-3/4 "	12-1/4 "
" upper arm, right	10-3/4 "	10-3/4 "
" " " left	10-3/4 "	10-3/4 "
Breadth neck	3.9 "	3.9 "
" shoulders	14.6 "	14.5 "
" waist	7.9 "	7.3 "
" hips	12 "	12 "
Depth chest	7.1 "	7.1 "
" abdomen	6.2 "	5.7 "
Capacity lungs	201	194
Muscles	187-1/4 lb.	185-1/4 lb.
Breadth fore arm, right	9-1/4 in.	9-1/2 in.
" " " left	9-1/4 "	9-1/4 "
Pulse, sitting	84	84
" standing	84	100
" on exertion	100	104
Respiration, sitting	12	16
" standing	16	16

On March 2nd subjects I and II began the diet. At the end of the fifth day subject II had lost three pounds in weight. Subject I had lost $4\frac{3}{4}$ lbs. The first day or two there was a feeling of hunger and a longing for something else to eat. By the ninth day this feeling had entirely disappeared.

The abrupt change from the mixed diet to the fruits and nuts caused diarrhoea for the first few days.

By the 14th day of the diet subject I had lost five pounds in weight; subject had lost $6\frac{3}{4}$ pounds. Subject II was unable to attend college. She was weak, pain in head, and unable to properly digest the fruits and nuts. Stomach and bowels were sore on pressure. Therefore subject II went off the diet and subject III took it for the remaining fourteen days.

By the 21st day subject I was greatly lessened in vitality, pale and no appetite. Subject IV took her place in the dietary. At the end of the month subjects III and IV had lost in weight and were weaker.

In changing from the fruit and nut diet back to the mixed diet, it was found that the stomach was very sensitive to materials that were either hot or cold. The change had to be made very gradually.

The results obtained from this diet would have been quite different if fruits and nuts had been gradually introduced in the diet for a month or two before, thereby avoiding the abrupt change of diet.

The difficulty that is met with in the absolute fruit

and nut diet, is that it is impossible to eat enough of the fruits and nuts to produce the required number of calories which the body demands.

In order to digest nuts they must be masticated thoroughly. When eating such large quantities of nuts the jaws become tired and one is apt not to masticate the nuts thoroughly, then digestive disorders will occur. The liability of the nuts being rancid is great and this will also cause digestive disorder.

It is true that our knowledge of fruits and nuts is very limited, but enough work has been done along this line to show that they are quite thoroughly digested and have much higher nutritive value than is popularly attributed to them.

In view of this it is certainly an error to consider nuts merely as an accessory to an already heavy meal, and to regard fruits as something of value for their pleasant flavor.